

**From:** "Safi Bahcall" <[REDACTED]>  
**To:** "Jeffery Edwards" <jeevacation@gmail.com>  
**Subject:** My book *Loonshots* launches today - excerpt below - how you can help  
**Date:** Tue, 19 Mar 2019 14:17:05 +0000

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Dear Jeffery,

Below is an excerpt from my new book, [\*Loonshots: How to Nurture the Crazy Ideas that Win Wars, Cure Diseases, and Transform Industries\*](#), which launches today. In *Loonshots*, I show how a new kind of science reveals a surprising way to think about human nature, the mysteries of innovation, and the fate of companies and empires.

You'll hear stories of thieves and geniuses and kings, and examples that range from the spread of fires in forests to the hunt for terrorists online. *Loonshots* distills the science and the stories into practical lessons for creatives, entrepreneurs, and visionaries everywhere.

Last week, **Tim Ferriss** devoted the first of a 2-part podcast to *Loonshots*, "[On Thinking Big, Curing Cancer, and Transforming Industries](#)." **Daniel Kahneman**, *The Financial Times*, *Nature*, and others have also all recommended *Loonshots*:

- **Business Insider:** "14 Books Everyone Will Be Reading in 2019"
- **Inc.:** "10 Books You Need to Read in 2019"
- **Washington Post:** "10 Leadership Books to Watch for in 2019"

I hope you'll consider reading it too. If you do, I'll be eager to know what you think. [Email me](#) or connect on [LinkedIn](#), [Twitter](#), or [Facebook](#), and post or share there.

I would be enormously grateful if you wish to help. Here's what you can do:

1. First week sales count the most, so if you'd like to purchase a copy, please consider doing so this week.
2. Write a review on Amazon as early as you can—the reviews and stars there mean a lot.
3. Share on social media using these convenient links for your [Twitter](#), [Facebook](#), and [LinkedIn](#).

Best wishes,  
Safi

P.S. Although the underlying idea derives from physics, equations are quarantined safely in an Appendix (except for one, which escaped).

Buy a copy:

- [Amazon](#)
- [Barnes & Noble](#)
- [Indiebound](#)
- [iTunes](#)

Learn more about [Loonshots](#).

"This book has everything: new ideas, bold insights, entertaining history and convincing analysis. Not to be missed by anyone who wants to understand how ideas change the world." —**Daniel Kahneman**, winner of the Nobel Prize, author of *Thinking, Fast and Slow*

"An ambitious and entertaining effort to lay out some fundamental laws of success and uncover the truth about successful group behavior... Bahcall makes the whole idea sing by bringing in references from across business, history, cinema and science." —**Financial Times**

"[A] witty, invigorating exploration of human behaviour and discovery." —**Nature**

"This thorough, fascinating study will appeal to a broader audience than just business wonks." —**Booklist**

"Should be required reading for anyone serious about changing the world for the better." —**Robert Laughlin, winner of the Nobel Prize in physics, Professor at Stanford**

"Who knew that one idea could connect naval battles, chirping crickets, and the birth of modern science? If *The Da Vinci Code* and *Freakonomics* had a child together, it would be called *Loonshots*." —**Senator Bob Kerrey, Medal of Honor recipient, former Navy SEAL**

"Wonderful ... Explores the beauty, quirkiness and complexity of ideas ... you need to read this book." —**Siddhartha Mukherjee, Pulitzer Prize-winning author of *The Emperor of All Maladies***

"Riveting stories ... fresh ideas and practical solutions—an unusual combination of psychology and physics." —**Amy C. Edmondson, author of *The Fearless Organization* and Professor at Harvard Business School**

"Anyone interested in a fresh approach to innovation—with lots of lively examples—should read this book." —**Eric Maskin, winner of the Nobel Prize in economics, Professor at Harvard**

## Prologue

A dozen or so years ago, a friend took me to see a play called *The Complete Works of William Shakespeare (Abridged)*. Three actors covered 37 plays in 97 minutes (including Hamlet in 43 seconds). They skipped the boring stuff. Not long afterward I was invited to give a talk at a business gathering. The topic was my choice, but it could not be related to my job. I presented "3,000 years of physics in 45 minutes"—the eight greatest ideas in the history of the field. I skipped the boring stuff.

That greatest hits show ran on and off until 2011, when the personal hobby crossed paths with a professional assignment. I was asked to join a group developing recommendations for the president on the future of US national research. On the first day, our chairman announced our mission. What should the president do to ensure that national research continues to improve the well-being and security of our country for the next fifty years? Our task, he said, was to create the next generation of the Vannevar Bush report.

Unfortunately, I'd never heard of Vannevar Bush, or his report. I soon learned that Bush developed a new system, during the Second World War, for nurturing radical breakthroughs astonishingly fast. His system helped the Allies win that war, and the United States lead the world in science and technology ever since. Bush's goal: that the US should be the initiator, not the victim, of innovative surprise.

What Bush did, and why he did it, came right back to one of those eight greatest ideas of physics: phase transitions.

In this book, I'll show you how the science of phase transitions suggests a surprising new way of thinking about the world around us—about the mysteries of group behavior. We will see why good teams will kill great ideas, why the wisdom of crowds becomes the tyranny of crowds when the stakes are high, and why the answers to these questions can be found in a glass of water.

I'll describe the science briefly (skipping the boring stuff). And then we'll see how small changes in structure, rather than culture, can transform the behavior of groups, the same way a small change in temperature can transform rigid ice to flowing water. Which will give all of us the tools to become the initiators, rather than the victims, of innovative surprise.

Along the way, you will learn how chickens saved millions of lives, what James Bond and Lipitor have in common, and where Isaac Newton and Steve Jobs got their ideas...

In thinking about the behavior of large groups of people in this way, we are joining a growing movement in science. Over the past decade, researchers have been applying the tools and techniques of phase transitions to understand how birds flock, fish swim, brains work, people vote, criminals behave, ideas spread, diseases erupt, and ecosystems collapse. If twentieth-century science was shaped by the search for fundamental laws, like quantum mechanics and gravity, the twenty-first will be shaped by this new kind of science.

None of which changes the well-established fact that physics rarely mixes with the study of human behavior, let alone sits down for a full-course meal, so some sort of explanation is in order. I was born into the field. Both my parents were scientists, and I followed them into the family business. After a few years, like many who follow their elders, I decided I should see other parts of the world. To my parents' horror, I chose the business world. They responded to my lost academic career with the five stages of grief, starting with denial (telling family friends it was just a phase), skipping quickly past anger to bargaining and depression, before settling into resigned acceptance. I missed science enough, however, that eventually I joined forces with a handful of biologists and chemists to start a biotech company developing new cancer drugs.

My interest in the strange behaviors of large groups of people began shortly afterwards, with a visit to a hospital.

\* \* \*

ONE WINTER MORNING IN 2003, I drove to the Beth Israel Deaconess Medical Center in Boston to meet a patient named Alex. Alex was 33, with the strong, graceful build of an athlete. He had been diagnosed with an aggressive form of cancer called Kaposi's sarcoma. Six regimens of chemotherapy had not stopped his disease. His prognosis was poor. A handful of scientists and I had spent two years preparing for this moment. Alex was scheduled to be the first patient to receive our new drug for treating cancer.

When I entered his room, Alex was lying in bed, attached to an IV drip, speaking softly to a nurse. A yellowish liquid, our drug, fed slowly into his arm. The physician had just left. Then the nurse, who had been writing up notes in the corner, closed her folder, waved, and left. Alex turned to me with a gentle smile and quizzical look. The frenzy of activity to get to this day—licensing discussions, financings, laboratory studies, safety experiments, manufacturing checks, FDA filings, protocol drafting, and years of research—melted away. Alex's eyes asked the only thing that mattered: would the yellowish liquid save his life?

Physicians see this look all the time. I didn't.

I pulled up a chair. We talked for nearly two hours, as the drug dripped into Alex's arm. Restaurants, sports, the best cycling paths in Boston. Toward the end, after a pause, Alex asked me what would be next, if our drug didn't work. I stumbled through some non-answer. But we both knew. Despite tens of billions of dollars spent every year on research by national labs and large research companies, sarcoma treatment hadn't changed in decades. Our drug was a last resort.

Two years later, I found myself pulling up a chair next to another bed, in a different hospital. My father had developed an aggressive type of leukemia. One older physician told me, sadly, that all he could offer was the same chemotherapy he had prescribed as a resident forty years earlier. Second, third, and fourth opinions and dozens of desperate phone calls confirmed what he said. No new drugs. Not even any promising clinical trials.

There are some technical reasons why cancer drug development is so difficult. So many things have broken down inside a cancer cell by the time it starts proliferating that there's no easy fix. Laboratory models are notoriously bad at predicting results in patients, which leads to high failure rates. Clinical trials take years to conduct and can cost hundreds of millions of dollars. All these points are true.

But there's more.

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